REMARKS

The Office Action of September 25, 2008 has been carefully considered.

Claim 2 has been rejected under 35 USC 112, 2nd paragraph, on the basis that "the conductor" lacks antecedent basis. This term has now been changed to "the material," referring to the conductive material of claim 15, and withdrawal of this rejection is requested.

The previous prior art rejections have been withdrawn. Claims 15, 17, 18, 22, 23, 26 and 27 have now been rejected under 35 USC 102(b) over Nagate, while claim 24 has been rejected under 35 USC 103(a) as obvious over Nagate, and claim 16 has been rejected under 35 USC 103(a) as obvious over Nagate in view of Harris.

The invention is directed to a method for electrically conductive connection of at least two wires having an insulating lacquer coating in which the wires are placed in contact with each other and at least partially enclosed within an electrically conductive material. The wires are then subjected to ultrasound, causing relative movement between the wires and between the wires and the electrically conductive material, and causing deformation of the electrically conductive material. This relative movement causes the insulating lacquer of the wires to be broken away in the contact regions, and a fixed connection is formed between the electrically conductive material and the contacting wires, simultaneously with an electrically conductive connection between the wires.

This rejection is based on a machine translation of Nagate, and this translation is not very clear. However, Nagate does disclose the manufacture of connector pin by placing insulated wires into the connector pin. Instead of removing the insulation with a roller, the wires and the pin are subjected to ultrasonic vibrations in the device shown in

LAW OFFICES
DENNISON, SCHULTZ & MACDONALD
SUITE 105
1727 KING STREET
ALEXANDRIA, VIRGINIA 22314-2700
703 837-9600

Fig. 3.

However, in paragraph [0020], it is stated: "...since the lead 3 has an insulating film If tool Horn 14 adds supersonic vibration at right angles to the piece 9 of sticking by pressure, in response to the vibration, an insulating film will be in a molten state, and will deposit outside, and, as for the main part 2 of a connector pin, the lead 3 which has an insulating film will be in switch-on electrically completely. Furthermore, after an insulating film solidifies, since the piece 9 of sticking by pressure of the wire terminal area 5 is stuck to the main part 2 of a connector pin by pressure, it does not exfoliate."

Further, it is stated in paragraph [0022]: "Moreover, since according to the manufacture method of the connector pin by this invention the insulating film of the lead was destroyed by supersonic vibration and the lead was stuck to the connector pin by pressure..."

What appears to be disclosed here is an insulation that melts and fuses to the connector, and wires that are held in the connector by pressure, with the lugs of the crimp shoe bent over. Nagate thus discloses an ultrasonic treatment for wires with *thermoplastic* insulation causing the insulation to melt, as was also disclosed in the Lopire reference, cited previously. However, Nagate does not disclose wires with a *lacquer* coating that is broken away by the ultrasound treatment, or disclose that "a fixed connection is formed between the electrically conductive material and the contacting wires" as a result of the ultrasound treatment, as is presently claimed. There is no evidence in Nagate that the wires are ultrasonically welded.

As evidence of the type of ultrasonic treatment performed by Nagate, Applicant submits herewith a publication "Ultrasonic Metal Welding," STAPLA Ultraschall-Technik, STAPLA Ultrasonics Corporation, 1997, D-86895 Landsberg/Lech, pp. 10-

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DENNISON, SCHULTZ & MACDONALD
SUITE 105
1727 KING STREET
ALEXANDRIA VIRGINIA 22314-2700
703 837 9600

11, labeled "EXHIBIT."

The EXHIBIT shows the difference in arrangement between ultrasonic welding of plastics (a) and metal (b). Clearly, the arrangement shown in Nagate (Fig. 3) corresponds to arrangement (a) of the EXHIBIT, used for welding plastics. Oscillations are introduced vertically.

Conversely, the arrangement (b) of the EXHIBIT, used for welding metals, corresponds to the arrangement used for ultrasonic welding of wires according to the invention. Oscillations are introduced horizontally; see Fig. 3a of the application.

Thus, Nagate uses ultrasonic energy solely for the purpose of melting a thermoplastic insulation of wires in a connector, without actually welding the wires to each other or to the connector.

Harris has been cited to show that it is known to join lacquered and non-insulated wires, but does not otherwise suggest the invention.

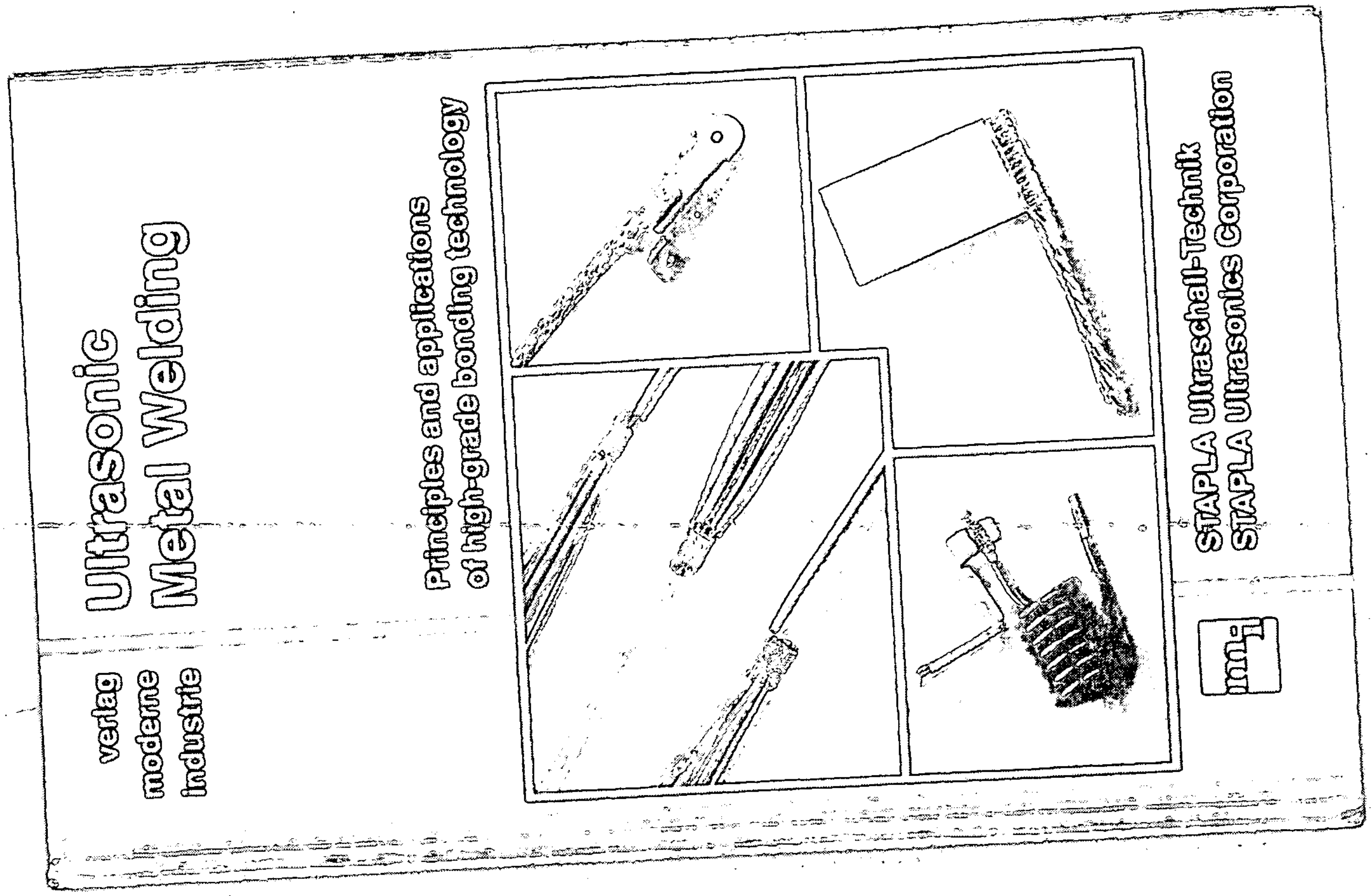
Accordingly, the references of record do not disclose or suggest the claimed invention, and withdrawal of these rejections is requested.

In view of the foregoing amendments and remarks, Applicant submits that the present application is now in condition for allowance. An early allowance of the application with amended claims is earnestly solicited.

Respectfully submitted,

Ira J. Schultz
Registration No. 28666
Attorney for Applicant
(703)837-9600, ext. 23

LAW OFFICES
DENNISON, SCHULTZ & MACDONALD
SUITE 105
1727 KING STREET
ALEXANDRIA, VIRGINIA 22314-2700
703 837-9600


Ultrasonic Metal Welding

Principles and applications of high-grade bonding technology

verlag moderne industrie

STAPLA Ultraschall-Technik
STAPLA Ultrasonics Corporation

EXHIBIT

This book was produced with the technical collaboration of
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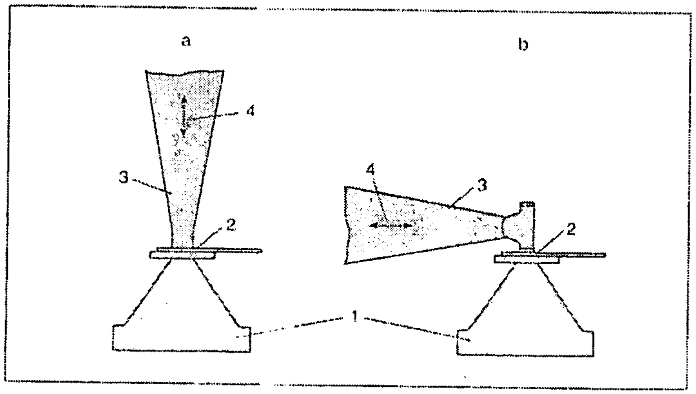
Contents

Ultrasonic welding

When bonding material through ultrasonic welding, the energy required comes in the form of mechanical vibrations. The welding tool (sonotrode) couples to the part to be welded and moves it in longitudinal direction. The part to be welded on remains static. Now the parts to be bonded are simultaneously pressed together. The simultaneous action of static and dynamic forces causes a fusion of the parts without having to use additional material. This procedure is used on an industrial scale for linking both plastics and metals (fig. 5).

Fig. 5. Differences in the process for welding plastics and metals with ultrasonics
1 Anvil 2 Parts to be welded 3 Sonotrode
4 Ultrasonic oscillation



Ultrasonic welding of plastics

Oscillations are introduced vertically

Ultrasonic welding of plastics is a state-of-the-art technology that has been in use for many years. When welding thermoplastics, the thermal rise in the bonding area is produced by the absorption of mechanical vibrations, the reflection of the vibrations in the connecting area, and the friction of the surfaces of the parts. The vibrations are introduced vertically. In the contraction area, frictional heat is produced so that the material plasticizes locally, forging an insoluble connection between both parts within a very short period of time.

The prerequisite is that both working pieces have a near equivalent melting point. The joint quality is very uniform because the energy transfer and the released internal heat remains constant and is limited to the joining area. In order to obtain an optimum result, the joining areas are prepared to make them suitable for ultrasonic bonding. Besides plastics welding, ultrasonics can also be used to rivet working parts or embed metal parts into plastic.

Ultrasonic metal welding

Whereas in plastic welding, high-frequency vertical vibrations (20 to 70 kHz) are used to increase the temperature and plastify the material, the joining of metals is an entirely different process. Unlike in other processes, the parts to be welded are not heated to melting point, but are connected by applying pressure and high-frequency mechanical vibrations.

Horizontal oscillation direction

In contrast to plastics welding, the mechanical vibrations used during ultrasonic metal welding are introduced horizontally.